Appln. No. 09/511,408   <u>PATENT</u>
Amdt. dated January 27, 2004
Reply to Office Action of October 27, 2003

<u>REMARKS/ARGUMENTS</u>

Claims 1-5 stand rejected under 35 U.S.C. §103(a) over Wober et al. ('505) in view of Ito ('359). The Examiner contends that Wober teaches all of the elements of the claimed invention except use of pixels with predetermined color values and analog luminance values. The Examiner has cited Ito for teaching the use of analog luminance values for reducing processing.

The Examiner has taken official notice that both the concept and the advantages of pixels with predetermined color values are notoriously well known and expected in the art, presumably because various three primary color pixel configurations are known in the art.

Claim 1 has been amended to point out more clearly distinct features of the invention. The present invention presents a method of correcting white balance of an image of an object using the state of the analog signal for each color element of each pixel by individually adjusting the analog gain of the individual primary colors (RGB) as read out as a time series from the image sensor. By contrast, the Wober reference is addressing the issue of saving a recording of a DCT compressed image by changing the brightness of the dark portions of the image object. The Applicants submit that the Wober reference has nothing to do with the issues addressed in the claimed invention. Although there is description in Wober stating that the signal flowing from a sensor is digitized, compressed and saved as part of the apparatus of the described invention therein, Wober is silent on the subjects of gain of an analog signal and adjustment of white balance (Col. 3, lines 44-52).

Moreover, in Wober, Col. 4, lines 5-15, where the signal processing method is described, it is clearly indicated that the brightness is adjusted at the time of decompression of the digitized, compressed digital data. It is clearly stated also that the brightness adjustment applies only to digital image. Col. 4, lines 32-47. There is no description whatsoever on the processing of the analog signal obtained from the image sensing element, or even on the signal in states where imaging is not performed.

The reference to Ito fails to cure the deficiencies in Wober. Ito provides a mechanism for performing white balance adjustment based on the subject matter in the image. The output of the image pick-up element (14 of Figure 2) is a color image signal. Col. 4, lines 23-26. There is no description suggesting that white balance processing is performed in this

image sensing or pick-up element. There must be some decision making process to decide what the image is. Moreover, it is clearly described that there is separation of brightness signals Y (YH, YU) and color difference signals (R, B) involving the functions of a luminance signal and chromaticity signal producing circuit (16 of Figure 2). Col. 3, lines 1-25.

It is clear from the explanation of the method of making adjustments to gain (gain control circuits 18 and 20) based on judgments of the face of the imaged object that the input and output of the gain control circuits are images. Col 4, lines 32-44. Thus, an output image is created by merely uniformly adjusting a total gain without undertaking any white balance process in the image pick-up element (14). White balance processing is made later, after the image signal is separated. As a consequence, the same or similar problems will be encountered in the cited technique as in the other conventional prior art. The gradation of bright portions of the image is lost due to partial saturation, or if saturation is suppressed, noise increases in low luminance source images. When applied to high density digital still camera (DSC) images, where the area of an individual detection cell of the sensor is smaller than the video sensor described in Ito, brightness saturation and low light noise are serious problems, and high quality images cannot be produced.

The present invention is intended to overcome those deficiencies. In both embodiments described in the present specification, white balance related gain adjustment is performed prior to performing the interpolation processing and various other image processing. It is therefore respectfully submitted that the present invention, particularly as now amended, is a nonobvious advance over the state of the art.

Claims 2 - 10 recited further specificities of the present invention which are likewise patentable.

As to claim 2, the Examiner noted that Wober discloses use of the luminance correction control section in series with the image signal. The Applicants point out the foregoing arguments that show that the Wober reference does not teach the color correction processing of the raw output of the image capture element, let alone serial output from the image capture element.

As to claim 3, the Examiner noted that Wober discloses use of a correction control section that generates a luminance correction amount corresponding to each pixel based

on a clock signal synchronized with the luminance information in the pixel, further contending that a luminance correction amplification section would be inherent to adjustment mechanisms. The Applicants point out that Wober misses the point of processing white balance on the raw analog signal. The disclosure in Wober fails to address this issue.

As to claim 4, the Examiner noted that Wober discloses use of a first correction control section for generating a luminance correction, a second correction control section for generating a luminance correction and the use of the combination of correction amounts to adjust pixel luminance. Again the Applicants point out that the elements described in Wober do not process the same signals as do the elements of the claimed invention.

As to claim 5, the Examiner noted that Wober discloses that the correction coefficients are formed in units of pixels, and that the correction section selects and uses the luminance correction amounts as the correlation coefficients in units of pixels. Again the Applicants point out that the elements described in Wober do not process the same signals as do the elements of the claimed invention. The correction coefficients are thus of a different makeup.

Claims 6-10 stand rejected under 35 U.S.C. §103(a) over Wober et al. ('505) in view of Ito ('359) and further in view of Sakaguchi ('916).

As to claims 6 and 7, the Examiner contended that Wober discloses all of the elements of the claimed invention except the use of correction amounts corresponding to coordinate positions defined by two-dimensional coordinates within the image to generate the correction amount. The Examiner has represented that Sakaguchi discloses preferred use of two-dimensional coordinates in order to obtain correction amounts to correct shading problems created by the lens. Again the Applicants point out that the elements described in Wober do not process the same signals as do the elements of the claimed invention.

As to claims 8, 9 and 10, the Examiner contended that Wober discloses all of the elements of the claimed invention except the use of correction amounts corresponding to two correction distribution characteristics changing in axial directions of two coordinate axes. The Examiner had represented that Sakaguchi discloses use of two-dimensional coordinates within the image to generate the correction amount and has asserted that inherency of two correction distribution characteristics changing in axial directions on grounds that the correction amount is

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dependent on pixel position. Again the Applicants point out that the elements described in Wober do not process the same signals as do the elements of the claimed invention.

As to claims 9 and 10 particularly, the Examiner contended that it is implied that if the two correction amounts are dependent on the position on each axis that if the values increased as it moved outward, the sum of the two would increase the correction amount based on pixel position. Again the Applicants point out that the elements described in Wober do not process the same signals as do the elements of the claimed invention.

With all due respect, it is the Applicants' contention that The Wober reference is not properly applied and that the combination of references would not suggest the present invention, particularly as now claimed.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

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